IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Shaun Kazuo WAKUMOTO et al.	**Confirmation No.:**	2771
Serial No.:	10/812,260	**Examiner:**	Warner WONG
Filed:	March 29, 2004	**Group Art Unit:**	2471

Title: DIRECTED COST PROTOCOL

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APPEAL BRIEF - PATENTS

Sir:

This is an Appeal Brief in connection with the decisions of the Examiner in a Final Office Action mailed February 25, 2010, and in connection with the Notice of Appeal filed on May 21, 2010.

It is respectfully submitted that the present application has been at least twice rejected.

Each of the topics required in an Appeal Brief and a Table of Contents are presented herewith and labeled appropriately.

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(1)   Real Party in Interest

The real party in interest is Hewlett-Packard Development Company, LP, a limited
partnership established under the laws of the State of Texas and having a principal place of
business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a
Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a
Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of
HPDC is HPQ Holdings, LLC.

(2)   Related Appeals and Interferences

The Appellant is unaware of any appeals or interferences related to this case.

(3)   Status of Claims

Claims 1-21 are pending and stand rejected.

Pursuant to 37 C.F.R. § 41.37, the Appellant hereby appeals the Examiner's decision
finally rejecting all of the pending claims to the Board of Patent Appeals and Interferences.
Therefore, claims 1-21 of this application are appealed.

(4)   Status of Amendments

No amendment was filed subsequent to the Final Office Action dated February 25, 2010.

A copy of the claims at issue on appeal is attached as the Claims Appendix.

(5)   **Summary of Claimed Subject Matter**

Claims 1, 9 and 15 are the independent claims in this appeal. It should be understood that the citations below to the original disclosure as providing support for the claimed features are merely exemplary and do not limit the claim features to only those citations.

Claim 1.   A method (Fig. 6) of cost determination for paths between switches in a mesh, the method comprising:

defining a set of paths between each pair of the mesh switches, each pair comprising a source switch and a destination switch (606 in Fig. 6; *Specification*, page 13, lines 28-29 and page 14, lines 8-14);

calculating start-up costs for the previously defined paths (604 in Fig. 6; *Specification*, page 13, lines 7-16); and

recalculating costs for the previously defined paths using a directed cost protocol by transmitting a directed cost packet only down each of the previously defined paths from the destination switch to the source switch for each pair (612 in Fig. 6; *Specification*, page 14, lines 3-7 and 14-25).

Claim 9.   A switching mesh (Fig. 7) comprising multiple packet switches (Switches A, B, C, D, wherein each switch is shown in Fig. 3), the switching mesh including

means (Switch Control 304; *Specification*, page 8, lines 3-9) for defining a set of paths between each pair of the mesh switches, each pair comprising a first switch and a second switch (606 in Fig. 6; *Specification*, page 13, lines 28-29 and page 14, lines 8-14);

means (Switch Control 304; *Specification*, page 8, lines 3-9) for calculating start-up costs for the defined paths (604 in Fig. 6; *Specification*, page 13, lines 7-16); and

means (Switch Control 304; *Specification*, page 8, lines 3-9) for recalculating costs for the previously defined paths using a directed cost protocol by transmitting a directed cost packet only down each of the previously defined paths from the second switch to the first switch for each pair (612 in Fig. 6; *Specification*, page 14, lines 3-7 and 14-25).

Claim 15.   A packet switch (Fig. 3) in a switching mesh (Fig. 7), the packet switch comprising:

a plurality of ports (ports 320, 328, and 337 in Fig. 3) configured to connect to at least one destination switch in the switching mesh (*Specification*, from page 8, line 30 to page 9, line 7); and

a switch control device (Switch Control 304 in Fig. 3) coupled to the plurality of ports, wherein the switch control device is configured to define a set of paths from the packet switch to the destination switch, calculate start-up cost for the previously defined paths, and execute directed cost protocol instructions in order to recalculate costs for previously defined paths by receiving a cost packet transmitted from the destination switch only down each of the previously defined paths (*Specification*, page 13, lines 7-16 and 28-32; page 14, lines 3-7 and 14-25).

(6)   Grounds of Rejection to be Reviewed on Appeal

A.   Whether claims 1-3, 8, 9 and 15-18 were properly rejected under 35 U.S.C.

§103(a) as being unpatentable over U.S. Patent Application Publication No. 2005/0078656 to

Bryant (hereinafter "Bryant") in view of U.S. Patent No. 6,377,551 to Luo (hereinafter "Luo"),

and further in view of U.S. Patent No. 6,928,483 to Cain (hereinafter "Cain").

B.   Whether claims 4-6 and 19-21 were properly rejected under 35 U.S.C. §103(a) as

being unpatentable over Bryant in view of Luo and Cain, and further in view of U.S. Patent

Application Publication No. 2005/0249215 to Kelsey (hereinafter "Kelsey").

C.   Whether claims 7, 10 and 11 were properly rejected under 35 U.S.C. §103(a) as

being unpatentable over Bryant in view of Luo and Cain, and further in view of U.S. Patent

Application Publication No. 2005/0068941 to Erhart (hereinafter "Erhart").

D.   Whether claims 12-14 were properly rejected under 35 U.S.C. §103(a) as being

unpatentable over Bryant in view of Luo, Cain and Erhart, and further in view of Kelsey.

(7)   **Arguments**

   A.   The rejection of claims 1-3, 8, 9 and 15-18 under 35 U.S.C. §103(a) as being

unpatentable over Bryant in view of Luo, and further in view of Cain should be reversed.

   The test for determining if a claim is rendered obvious by one or more references for

purposes of a rejection under 35 U.S.C. § 103 is set forth in *KSR International Co. v. Teleflex*

Inc., 550 U.S. 398, 82 USPQ2d 1385 (2007):

> "Under §103, the scope and content of the prior art are to be determined;
> differences between the prior art and the claims at issue are to be ascertained; and
> the level of ordinary skill in the pertinent art resolved. Against this background
> the obviousness or nonobviousness of the subject matter is determined. Such
> secondary considerations as commercial success, long felt but unsolved needs,
> failure of others, etc., might be utilized to give light to the circumstances
> surrounding the origin of the subject matter sought to be patented." Quoting
> *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966).

   According to the Examination Guidelines for Determining Obviousness Under 35 U.S.C.

103 in view of *KSR International Co. v. Teleflex Inc.*, Federal Register, Vol. 72, No. 195, 57526,

57529 (October 10, 2007), once the *Graham* factual inquiries are resolved, there must be a

determination of whether the claimed invention would have been obvious to one of ordinary skill

in the art based on any one of the following proper rationales:

> (A) Combining prior art elements according to known methods to yield
> predictable results; (B) Simple substitution of one known element for another to
> obtain predictable results; (C) Use of known technique to improve similar devices
> (methods, or products) in the same way; (D) Applying a known technique to a
> known device (method, or product) ready for improvement to yield predictable
> results; (E) "Obvious to try"—choosing from a finite number of identified,
> predictable solutions, with a reasonable expectation of success; (F) Known work
> in one field of endeavor may prompt variations of it for use in either the same
> field or a different one based on design incentives or other market forces if the
> variations would have been predictable to one of ordinary skill in the art; (G)

Some teaching, suggestion, or motivation in the prior art that would have led one
of ordinary skill to modify the prior art reference or to combine prior art reference
teachings to arrive at the claimed invention. *KSR International Co. v. Teleflex
Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007).

Furthermore, as set forth in *KSR International Co. v. Teleflex Inc.*, quoting from *In re*

Kahn, 441 F. 3d 977, 988 (CA Fed. 2006), "[R]ejections on obviousness grounds cannot be

sustained by mere conclusory statements; instead, there must be some articulated reasonings with

some rational underpinning to support the legal conclusion of obviousness."

Furthermore, as set forth in MPEP 2143.03, to ascertain the differences between the prior

art and the claims at issue, "[a]ll claim limitations must be considered" because "all words in a

claim must be considered in judging the patentability of that claim against the prior art." *In re*

Wilson, 424 F.2d 1382, 1385.

- **Claims 1-3, 8-9, and 15-18:**

Claims 1-3, 8-9, and 15-18 were rejected under 35 U.S.C. §103(a) as being unpatentable

over Bryant in view of Luo and Cain. This rejection should be reversed for at least the following

reasons.

       o Independent Claim 1:

Independent claim 1 recites a method of cost determination for paths between switches in

a mesh, comprising, *inter alia*,

recalculating costs for the previously defined paths using a directed cost
protocol by transmitting a directed cost packet **only** down **each of the previously
defined paths** from the destination switch to the source switch for each pair.

Bryant in view of Luo and Cain fails to teach or suggest the claimed features recited above for at least the following reasons.

1. Bryant fails to teach or suggest recalculating costs by transmitting a cost packet down **each** of the previously defined paths.

Bryant discloses a data communications network (Fig. 1) having a plurality of interconnected nodes R1-R5 (See *Bryant*, paragraph [0035]). Each node R1-R5 includes a routing table for determining the lowest-cost path from the respective node to each destination node in the network (See paragraphs [0036]-[0038]). When a new node R6 is added to the network, the new node R6 floods the network with its link information to all nodes R1-R5 (See paragraph [0045]). In response, each node (such as R1) uses its routing table to calculate the lowest-cost path to the new node R6 (See paragraphs [0047]-[0058]).

Also, each node (R1) uses its routing table to recalculate the lowest-cost paths from that node (R1) to other nodes (R2-R5) by selecting links that have the lowest cost (See Figs. 6-7 and paragraphs [0059]-[0061]). At each juncture, when there is a plurality of possible paths to go from a source node (R1) to a destination node (R5), the system selects only one path that has the lowest cost. For example, Figs. 6-7 of Bryant show that, when a new node R6 is added to the network, the system recalculates the lowest cost path from source node R1 to destination node R5, by starting from the source node R1 and going link-by-link towards the destination node R5. At node R3, the path selects link Net8 to node R6, rather than link Net6 to node R5, because the cost of link Net 8 (which is 1) is less than the link Net6 (which is 4).

Thus, in Bryant, although there are two links (Net 8 and Net 6) to go from node R3 to the destination node R5, the system selects only one link that has the lowest cost. As such, the system in Bryant fails teach or suggest transmitting a cost packet down **each** (i.e., all) **of the previously defined paths** from the destination switch to the source switch, as recited in claim 1.

In the rejection of claim 1, the Examiner asserts that paragraphs [0008], [0028], and [0034] of Bryant disclose transmitting a directed cost packet down each of the previously defined paths (See *Final Office Action*, bottom of page 2 and top of page 3). However, that assertion is respectfully traversed. Paragraph [0008] of Bryant describes a problem in the network when a packet is caught in an infinite loop. Such an infinite loop causes a problem for the network because the packet is stuck in the infinite loop and never reaches the destination node. Thus, the infinite loop disclosed in paragraph [0008] is unrelated to transmitting a cost packet down each of the previously defined paths from the destination switch to the source switch, as recited in claim 1.

Paragraph [0028] fails to teach or suggest the claimed features recited above because it shows only a title "General Overview."

Paragraph [0034] discloses that in addition to a failure mode, a network change can take place when a link cost is increased or decreased, when a new router is introduced into the network, or when a router is removed from the network. Thus, paragraph [0034] merely describes different scenarios of when changes occur in a network. However, a change in a link cost and the addition or removal of a router are unrelated to whether a cost packet is transmitted down each of the previously defined paths. Therefore, contrary to the Examiner's assertion,

paragraph [0034] also fails to teach or suggest transmitting a cost packet down each the

previously defined paths, as recited in claim 1.

In view of the foregoing discussions, the disclosures in paragraphs [0008], [0028], and

[0034] and the rest of Bryant fail to teach or suggest transmitting a cost packet down each of the

previously defined paths, as recited in claim 1.

2. Cain fails to teach or suggest recalculating costs by transmitting a cost packet down
    only the previously defined paths.

Again, independent claim 1 recites,

> recalculating costs for the previously defined paths using a directed
> cost protocol by transmitting a directed cost packet **only** down each of the
> previously defined paths from the destination switch to the source switch for
> each pair.

In the rejection of claim 1, the Examiner correctly admits that Bryant in view of Luo fails

to teach or suggest transmitting a directed cost packet down **only** the previously defined paths

(See *Final Office Action*, near bottom of page 3).

The Examiner then asserts that Cain discloses transmitting a packet down only the

previously defined paths because of the term "fast path" in col. 6, lines 32-39 of Cain (See *Final

Office Action*, top of page 4). However, that assertion is respectfully traversed. Col. 6, lines 32-

39 of Cain discloses that the method in Fig. 9 is "for forwarding LSA (link state advertisement)

protocol messages by the fast path using a unicast addressing," wherein a "fast path" is the router

logic that simply receives and forwards packets, and does not process the received packets (as

opposed to the router logic that processes packets, referred to as the "control plane" of the router, See *Cain*, col. 1, lines 44-48). In other words, the term "fast path" is related to the forwarding function of the router and unrelated to whether the paths connected to the router were previously defined or not. As such, with the fast path, the router forwards all received packets, regardless of whether the paths that are connected to the router are new or previously defined. As a result, the phrase "forwarding the LSA protocol messages by the fast path" as disclosed in col. 6, lines 32-39 of Cain does not mean forwarding a cost packet down <u>only</u> the previously defined paths, as asserted by the Examiner. Nowhere in Cain teaches or suggests transmitting a cost packet down only the previously defined paths. Therefore, Cain fails to teach or suggest transmitting a cost packet <u>only</u> to the previously defined paths, as recited in claim 1.

Thus, Cain fails to cure the deficiencies of Bryant in view of Luo. As a result, the combination of Bryant in view of Luo and Cain fails to teach or suggest, "recalculating costs for the previously defined paths using a directed cost protocol by transmitting a directed cost packet **only** down each of the previously defined paths from the destination switch to the source switch for each pair," as recited in claim 1.

3. <u>Bryant in view of Luo fails to teach or suggest recalculating costs using a directed cost protocol.</u>

Again, independent claim 1 recites,

recalculating costs for the previously defined paths **using a directed cost protocol** by transmitting a directed cost packet only down each of the

previously defined paths from the destination switch to the source switch for
each pair.

In the rejection of claim 1, the Examiner correctly admits that Bryant fails to teach or
suggest recalculating costs for previously defined paths "using a directed cost protocol" as
recited in claim 1 (See *Final Office Action*, page 3, lines 4-5). The Examiner asserts that Luo
discloses that claimed feature because Luo discloses in step 44 of Fig. 3 recalculation using a
directed graph in Fig. 17 and col. 8, lines 64-67 (See *Final Office Action*, page 3, lines 6-9). The
Examiner also asserts that it would have been obvious to utilize the teaching of Luo into Bryant
(See *Final Office Action*, page 3, lines 10-12). However, those assertions are respectfully
traversed.

First, step 44 in Fig. 3 of Luo is a reevaluation step, which is part of a process of
expanding a spanning tree from a source node using <u>only</u> directed links that are known in the tree
(See *Luo*, col. 8, lines 64-67 and col. 9, lines 1-8 and Fig. 17). That means the expanding of the
spanning tree in Luo does not use new links. On the contrary, Bryant, as discussed above,
recalculates a new lowest cost path using new links that have the lowest cost, such as link Net 8
in Figs. 6-7. Therefore, the disclosure of using only directed links in the reevaluation step 44 of
Luo cannot be used in the recalculation of the lowest cost path of Bryant. As a result, one skilled
in the art would not have utilized the disclosure of Luo into Bryant, as proposed by the
Examiner.

In addition, the reevaluation step 44 in Fig. 3 of Luo is for determining whether the
destination node 6 is included in the set L (See *Luo*, col. 6, lines 30-33). The determination of

whether a node is included in a set does not include recalculating the <u>cost</u> of the previously

defined paths, as recited in claim 1. Therefore, the reevaluation step 44 of Luo is not the same as

or equivalent to "recalculating <u>costs</u> for the previously defined paths <u>using a directed cost</u>

<u>protocol</u>," as recited in claim 1.

      Accordingly, Luo fails to cure the deficiencies of Bryant in view of Cain. Thus, the

combination of Bryant in view of Luo and Cain fails to teach or suggest, "recalculating costs for

the previously defined paths using a directed cost protocol," as recited in claim 1.

      For at least the foregoing reasons, the Examiner has failed to establish that independent

claim 1 is *prima facie* obvious in view of the combined disclosures contained in Bryant in view

of Luo and Cain, as asserted in the Final Office Action. Therefore, reversal of the rejection of

independent claim 1 and allowance of the claim is respectfully requested.

       o <u>Independent Claims 9 and 15:</u>

      Independent claim 9 recites a switching mesh including, *inter alia*,

          means for defining a set of paths between each pair of the mesh
switches, each pair comprising a first switch and a second switch;
          means for calculating start-up costs for the defined paths; and
          means for recalculating costs for the previously defined paths using a
directed cost protocol by transmitting a directed cost packet only down each
of the previously defined paths from the second switch to the first switch for
each pair.

      Thus, the means recited in independent claim 9 perform the functions similar to the steps

recited in independent claim 1, namely, "defining a set of paths between each pair of the mesh

switches," "calculating start-up costs for the defined paths," and "recalculating costs for the

previously defined paths using a directed cost protocol by transmitting a directed cost packet

only down each of the previously defined paths from the second switch to the first switch for

each pair." Therefore, independent claim 9 is believed to be allowable over Bryant in view of

Luo and Cain for at least the same reasons set forth above with respect to independent claim 1.

Accordingly, it is respectfully requested that the rejection of independent claim 9 be reversed and

claim 9 be allowed.

     o   <u>Independent Claim 15:</u>

Independent claim 15 recites, *inter alia*,

> a switch control device coupled to the plurality of ports, wherein the
> switch control device is configured to define a set of paths from the packet
> switch to the destination switch, calculate start-up cost for the previously
> defined paths, and execute directed cost protocol instructions in order to
> recalculate costs for previously defined paths by receiving a cost packet
> transmitted from the destination switch only down each of the previously
> defined paths.

Thus, the switch control device in independent claim 15 performs the functions similar to

the steps recited in independent claim 1, namely, "define a set of paths from the packet switch to

the destination switch," "calculate start-up cost for the previously defined paths," and

"recalculate costs for previously defined paths by receiving a cost packet transmitted from the

destination switch only down each of the previously defined paths." Therefore, independent

claim 15 is believed to be allowable over Bryant in view of Luo and Cain for at least the same

reasons set forth above with respect to independent claim 1. Accordingly, it is respectfully

requested that the rejection of independent claim 15 be reversed and claim 15 be allowed.

- Dependent Claims 2-3, 8, 16-18:

Claims 2-3, 8, and 16-18 are dependent from one of independent claims 1 and 15. Thus,

they are also believed to be allowable over the cited documents of record for at least the same

reasons as set forth to independent claims 1 and 15 above. It is therefore respectfully requested

that the rejection of claims 2-3, 8, and 16-18 be reversed, and these dependent claims be allowed.

B.   The rejection of claims 4-6 and 19-21 under 35 U.S.C. §103(a) as being

unpatentable over Bryant in view of Luo and Cain, and further in view of Kelsey should be

reversed.

Claims 4-6 and 19-21 were under 35 U.S.C. §103(a) as being unpatentable over Bryant in

view of Luo, Cain, and Kelsey. This rejection should be reversed for at least the following

reasons.

Claims 4-6 and 19-21 are dependent from one of independent claims 1, 9, and 15. As

discussed above, the proposed combination of Bryant, Luo, and Cain fails to disclose all of the

features of independent claims 1, 9 and 15. In setting forth the rejection of claims 4-6 and 19-21,

the Examiner has not and cannot reasonably assert that the disclosure contained in Kelsey makes

up for any of the deficiencies discussed above with respect to the proposed combination.

Accordingly, even assuming for the sake of argument that one of ordinary skill in the art were

somehow motivated to modify the proposed combination of Bryant in view of Luo, and Cain

with the disclosure contained in Kelsey, the proposed modification would still fail to yield all of

the features of independent claims 1, 9, and 15.

For at least the foregoing reasons, the Examiner has failed to establish that claims 4-6 and

19-21 are *prima facie* obvious in view of the combined disclosures contained in Bryant, Luo,

Cain, and Kelsey. Therefore, reversal of the rejection of claims 4-6 and 19-21and allowance of

these claims are respectfully requested.

C.   The rejection of claims 7, 10 and 11 under 35 U.S.C. §103(a) as being

unpatentable over Bryant in view of Luo and Cain, and further in view of Erhart should be

reversed.

Claims 7, 10, and 11 were under 35 U.S.C. §103(a) as being unpatentable over Bryant in

view of Luo, Cain, and Erhart. This rejection should be reversed for at least the following

reasons.

Claims 7, 10, and 11 are dependent from one of independent claims 1 and 9. As

discussed above, the proposed combination of Bryant, Luo, and Cain fails to disclose all of the

features of independent claims 1 and 9. In setting forth the rejection of claims 7, 10, and 11, the

Examiner has not and cannot reasonably assert that the disclosure contained in Erhart makes up

for any of the deficiencies discussed above with respect to the proposed combination.

Accordingly, even assuming for the sake of argument that one of ordinary skill in the art were

somehow motivated to modify the proposed combination of Bryant in view of Luo, and Cain

with the disclosure contained in Erhart, the proposed modification would still fail to yield all of

the features of independent claims 1 and 9.

For at least the foregoing reasons, the Examiner has failed to establish that claims 7, 10,

and 11 are *prima facie* obvious in view of the combined disclosures contained in Bryant, Luo,

Cain, and Erhart. Therefore, reversal of the rejection of claims 7, 10, and 11 and allowance of

these claims are respectfully requested.

**D.   The rejection of claims 12-14 under 35 U.S.C. §103(a) as being unpatentable
over Bryant in view of Luo, Cain and Erhart, and further in view of Kelsey should be
reversed.**

Claims 12-14 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over

Bryant in view of Luo, Erhart and Kelsey. This rejection should be reversed for at least the

following reasons.

Claims 12-14 are dependent from claim 11. As discussed above, the proposed

combination of Bryant, Luo, Cain, and Erhart fails to disclose all of the features of claim 11. In

setting forth the rejection of claims 12-14, the Examiner has not and cannot reasonably assert

that the disclosure contained in Kelsey makes up for any of the deficiencies discussed above with

respect to the proposed combination. Accordingly, even assuming for the sake of argument that

one of ordinary skill in the art were somehow motivated to modify the proposed combination of

Bryant in view of Luo, Cain, and Erhart with the disclosure contained in Kelsey, the proposed

modification would still fail to yield all of the features of claim 11.

For at least the foregoing reasons, the Examiner has failed to establish that claims 12-14

are *prima facie* obvious in view of the combined disclosures contained in Bryant, Luo, Cain,

Erhart and Kelsey. Therefore, reversal of the rejection of claims 12-14 and allowance of these

claims are respectfully requested.

(8) Conclusion

For at least the reasons given above, the rejection of claims 1-21 described above should be reversed and these claims allowed.

Please grant any required extensions of time and charge any fees due in connection with this Appeal Brief to deposit account no. 08-2025.

Respectfully submitted,

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(9)   Claim Appendix

1. (Previously Presented) A method of cost determination for paths between switches in a mesh, the method comprising:

defining a set of paths between each pair of the mesh switches, each pair comprising a source switch and a destination switch;

calculating start-up costs for the previously defined paths; and

recalculating costs for the previously defined paths using a directed cost protocol by transmitting a directed cost packet only down each of the previously defined paths from the destination switch to the source switch for each pair.

2. (Previously Presented) The method of claim 1 wherein the directed cost protocol comprises generating at the destination switch a cost packet with path information associated with a specific path.

3. (Previously Presented) The method of claim 2 wherein the directed cost protocol further comprises unicasting the cost packet via the specific path to the source switch.

4. (Previously Presented) The method of claim 3 wherein intermediate switches along the specific path each add cost information to the cost packet prior to forwarding the cost packet to a next switch along the specific path.

5. (Original) The method of claim 4 further comprising repeating the recalculation at periodic intervals.

6. (Previously Presented) The method of claim 5 wherein the directed cost protocol further comprises piggybacking information for more than one path into the cost packet.

7. (Previously Presented) The method of claim 1 wherein the previously defined paths are identified by path tags inserted into packets sent between the mesh switches.

8. (Original) The method of claim 1, wherein start-up cost packets are flooded through the mesh in order to define the set of paths between each pair of mesh switches and calculate the start-up costs.

9. (Previously Presented) A switching mesh comprising multiple packet switches, the switching mesh including

      means for defining a set of paths between each pair of the mesh switches, each pair comprising a first switch and a second switch;

      means for calculating start-up costs for the defined paths; and

      means for recalculating costs for the previously defined paths using a directed cost protocol by transmitting a directed cost packet only down each of the previously defined paths from the second switch to the first switch for each pair.

10. (Previously Presented) The switching mesh of claim 9 wherein the previously defined paths are identified by path tags inserted into packets sent between the mesh switches, and wherein start-up cost packets are flooded through the mesh in order to define the set of paths between each pair of mesh switches and calculate the start-up costs.

11. (Previously Presented) The switching mesh of claim 10 further comprising means for repeating the recalculation at periodic intervals.

12. (Previously Presented) The switching mesh of claim 11, wherein the directed cost protocol comprises generating at the second switch a cost packet with path information associated with a specific path that begins at the first switch and ends at the second switch and unicast transmission of the cost packet via the specific path to the first switch.

13. (Previously Presented) The switching mesh of claim 12 wherein intermediate switches along the specific path each add cost information to the cost packet prior to forwarding the cost packet to a next switch along the specific path.

14. (Previously Presented) The switching mesh of claim 13 wherein the directed cost protocol further comprises piggybacking information for more than one path into the cost packet.

15. (Previously Presented) A packet switch in a switching mesh, the packet switch comprising:

a plurality of ports configured to connect to at least one destination switch in the switching mesh; and

a switch control device coupled to the plurality of ports, wherein the switch control device is configured to define a set of paths from the packet switch to the destination switch, calculate start-up cost for the previously defined paths, and execute directed cost protocol instructions in order to recalculate costs for previously defined paths by receiving a cost packet transmitted from the destination switch only down each of the previously defined paths.

16. (Previously Presented) The packet switch of claim 15 wherein the directed cost protocol instructions are configured to generate the cost packet with path information associated with a specific path between the packet switch and the destination switch.

17. (Previously Presented) The packet switch of claim 16 wherein the directed cost protocol instructions are further configured to unicast the cost packet via the specific path to the packet switch.

18. (Previously Presented) The packet switch of claim 17 wherein the directed cost protocol instructions are further configured to repeat the recalculation of costs for previously defined paths at periodic time intervals.

19. (Previously Presented) The packet switch of claim 18 wherein the directed cost protocol instructions are further configured to piggyback information for more than one path into the cost packet.

20. (Previously Presented) The packet switch of claim 18 wherein the directed cost protocol instructions are further configured to perform a flood discovery of paths at longer periodic time intervals.

21. (Previously Presented) The packet switch of claim 20 wherein path costs determined by the flood discovery of paths are used to substitute more efficient paths for less efficient paths.

(10)   Evidence Appendix

None.

(11)   Related Proceedings Appendix

None.